Original Research Article

ASSESSMENT OF POTABLE WATER SUPPLY IN AKURE NORTH LOCAL GOVERNMENT AREA, ONDO STATE, NIGERIA

Abstract

This paper assessed potable water supply in Akure North Local Government Area, Ondo State, Nigeria, with a view to suggesting strategies for improvement in water supply. This research made use of 466 copies of its research questionnaire administered randomly to household heads in five [5] selected communities of Akure North LGA. The selected communities are Ita-Ogbolu, Ogbese, Igoba, Iju, and Oba-Ile. A sample size of 466 respondents equalling 0.3 % of the population was randomly selected across the study area for questionnaire administration. The survey research design method through the use of questionnaire was employed to gather data on the assessment of potable water in the study area. Findings revealed protected hand dug well to be the dominant source of domestic water supply in all communities covered in the study. Huge percentage of the respondents reported that their main sources of water were not reliable during dry season while some said it was not reliable during the raining season. The respondents complained of long distance and the time it takes them to get water from their water source. Boiling of water was the main water treatment among households. Typhoid was the prevalent water borne diseases among households, closely followed by diarrhoea. The study therefore proposed the construction of mini water scheme by the state government and some corporate individuals; the water points should be within 500m of resident's homes; construction of a dam for multifarious purposes and enlightenment of residents on the need to treat their water adequately before use.

Keywords

Potable, Water, Well, Borehole, Pipe.

1. Introduction

Potable water is defined as source of water having acceptable quality in terms of its physical, chemical and bacteriological parameters, so that it can be safely used for drinking and cooking [1]. It is pictured as water which is fit for consumption by humans and other animals [2]. It is a truism that the world is facing severe and growing challenges of maintaining water quality and quantity meeting the rapidly growing demand for water resources [3]. People in many parts of the world today are in dire need of potable water [4]. Global water demand is expected to continue increasing at a similar rate until 2050, accounting for an increase of 20% to 30% above the current level of water use [5].

Adequate provision of potable water facilities is a critical challenge in developing countries such as Nigeria [2]. The report, released by Nigeria's Federal Ministry of Water Resources and UNICEF in 2019, said that one-third of the population drink contaminated water at home. Looking at this unfortunate scenario, it is worrisome to note that since there are non-readily accessible potable water facilities in our nation, towns and cities, Nigerians are constrained to using sachet water which can be assembled from anywhere with no guarantee of being safe for consumption. Justifying this view, Dada [6] posited that the integrity of the hygienic environment and conditions where majority of water in sachets in the markets are produced is a serious concern.

The Nigerian Government has long considered the provision of potable water to be the responsibility of the Federal, State and Local Governments [4]. Aligning with the submissions of Ibrahim *et al.*, [1] they argued that the federal government is in charge of water resources management; the state government has the primary responsibility for urban water supply; and local governments together with communities are responsible for rural water supply. However, it is neither an overstatement nor criticism to posit that the public sector has not recorded meaningful

success in meeting significant portion of the demand for water of residential and commercial users [7]. Many water supply systems in Nigeria are characteristically typified with extensive deterioration and poor utilization of the existing capacities, due to under-maintenance and lack of funds for operation [1]. It is even quite pathetic to note that many water supply systems started some years back are not yet completed while those completed are in a state of comatose [8].

It is quite unfortunate that as a result of inability of government at different level to provide potable water facilities for her citizenry, private individuals and communities are constrained to seek alternatives and self-help measures of providing water [9]. They further reported that some residents dig wells while others access their own water supply from relatively unsafe sources. It is pathetic to note that out of the 85 million people living in Nigerian towns and cities less than half have reasonable access to reliable water supply [1]. This issue of inadequacy in potable water facilities provision could be attributed to the reason for the prevalence of water borne disease epidemics in the nook and cranny of Nigeria [2]. Abaje *et al.* [4] contended that more than half of the deaths recorded in the nation's health facilities in the last eight years are caused by complications arising from bad water and poor sanitation.

The rationale behind the choice of Akure North Local Government Area, Ondo State, Nigeria as the research locale is not far-fetched. Generally, access to piped drinking water which is aptly termed as safe water is grossly low in Ondo State. Specifically, about 8% of the households in the state have access to piped drinking water [10]. Just like other LGAs in Ondo State, Akure North Local domestic water supply situation is deplorable with antiquated water infrastructure, leaking pipes leading incessant water shortages, and vandalism of infrastructure among others. Therefore, this study is directed towards addressing the issue of potable water provision with a view to suggesting strategies for improvement in water supply. This paper thus provides answers to the following questions: what is the main source of potable water supply available to residents in the study area, what are the problems associated with the identified main water source and how can these problems be mitigated?

2. Literature Review

Water is a natural resource of fundamental importance. This is because it supports all forms of life and creates jobs and wealth in the water sector, tourism, recreation and fisheries [11]. Without water, life as it exists on our planet, is impossible [12]. The importance of continuing the development of a safe water supply for humanity across the globe cannot be overstressed. Safe water is necessary for health and well-being and is a basic human right. Historically, in industrialized countries, virtually all diseases, such as cholera, polio, and typhoid fever were eliminated in communities where safe and clean drinking water was made available [13]. The same would be the case in developing countries if safe and clean water supplies were to become available. No amount of medical supplies or healthcare facilities can achieve such a goal at a reasonable cost.

Potable water should be colourless, tasteless and odourless. It should be free from fluorine, arsenic, nitrates, and nitrite and lead contents. Also, potable water should not be associated with water borne disease during and after use [1]. However, human activities comprising discharge of both domestic and industrial wastewaters have resulted in pollution of the common sources of water that are available to households. Water pollution occurs when pollutants with potentials to threaten human and other natural systems find their ways into rivers, lakes, wells, streams, boreholes or even reserved freshwater at homes and in industries [14].

Developing water systems that allow over six billion people to have access to safe and clean water is no small feat. The efforts of governments and international organizations such as UNICEF and WHO have provided over one billion people access to clean water which they otherwise would not have had, however, there still remains over one billion people who do not have access to safe water supply [13]. According to the 2008 UNICEF ''Handbook on Water Quality,'' insufficient water supplies coupled with poor sanitation causes 3.4 million deaths per year, which translates into someone dying every 10 seconds [13]. The majority of these deaths occur in children due to their higher susceptibility to catching diseases.

Reasons for the unavailability of safe water relate to enormous capital investment and operating expenses that must be incurred to be able to provide reliable and safe water; this is simply out of the reach of most developing countries. Preventing contamination and implementing sustainable treatment technologies are ways to increase access to safe drinking water [13].

Conceptual Framework

This study adopts the Sustainable Development Goals [SDG] number 6 [clean water and sanitation] as its operational framework which focuses on ensuring availability and sustainable management of water and sanitation for all. Everyone on earth should have access to safe and affordable drinking water. That's the goal for 2030. While many people take clean drinking water and sanitation for granted, many others do not. Water scarcity affects more than 40 percent of people around the world, and that number is projected to go even higher as a result of climate change [15].

More and more countries are experiencing water stress, and increasing drought and desertification is already worsening these trends. By 2050, it is projected that at least one in four people will suffer recurring water shortages [15]. Safe and affordable drinking water for all by 2030 requires we invest in adequate infrastructure, provide sanitation facilities, and encourage hygiene. Protecting and restoring water-related ecosystems is essential. Water stress affects more than 2 billion people, with this figure projected to increase.

71 percent of the global population, 5.2 billion people, had safely-managed drinking water in 2015, but 844 million people still lacked even basic drinking water [15].

Goal 6 Targets:

1. By 2030, achieve universal and equitable access to safe and affordable drinking water for all,
2. By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations,
3. By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally,
4. By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity,
5. By 2030, implement integrated water resources management at all levels, including through trans-boundary cooperation as appropriate,
6. By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes,
7. By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies,
8. Support and strengthen the participation of local communities in improving water and sanitation management.

Water scarcity, poor water quality and inadequate sanitation negatively impact food security, livelihood choices and educational opportunities for poor families across the world. At the current time, more than 2 billion people are living with the risk of reduced access to potable water resources and by 2050, at least one in four people is likely to live in a country affected by chronic or recurring shortages of potable water [15]. Drought in specific afflicts some of the world's poorest countries, worsening hunger and malnutrition. Fortunately, there has been great progress made in the past decade regarding drinking sources and sanitation, whereby over 90% of the world's population now has access to improved sources of drinking water [15].

3. Materials and Methods

3.1 Study Area

This research was conducted in Akure North Local Government Area of Ondo State, Nigeria. Specifically, the research was conducted in five [5] selected communities in Akure North LGA. The selected communities were:

Ita-Ogbolu, Ogbese, Igoba, Iju, and Oba-Ile. Akure North Local Government Area is among the serving local government councils of the state which has her headquarter in Itagbolu town. It has an area of 660km² of land. Akure North LGA is located within latitudes 7° 7'N and 7°44'N, and longitudes 5°07'E and 5° 47'E, with an average altitude 356 metres above the sea level. The soils are typically deep, well-drained, and coarse in texture at the top. The subsoils are however distinguished by a conspicuous presence of mottles, which suggests that they are poorly drained. The vegetation type is forest vegetation categorized as forests, gallery forests and forest reserves. The tropical climate of Akure North LGA is broadly of two seasons: wet season [April - October] and dry season [November - March]. The temperature throughout the year ranges from 21°C to 29°C, and humidity is relatively high [about 80%]. The annual rainfall is about 1524mm [16].

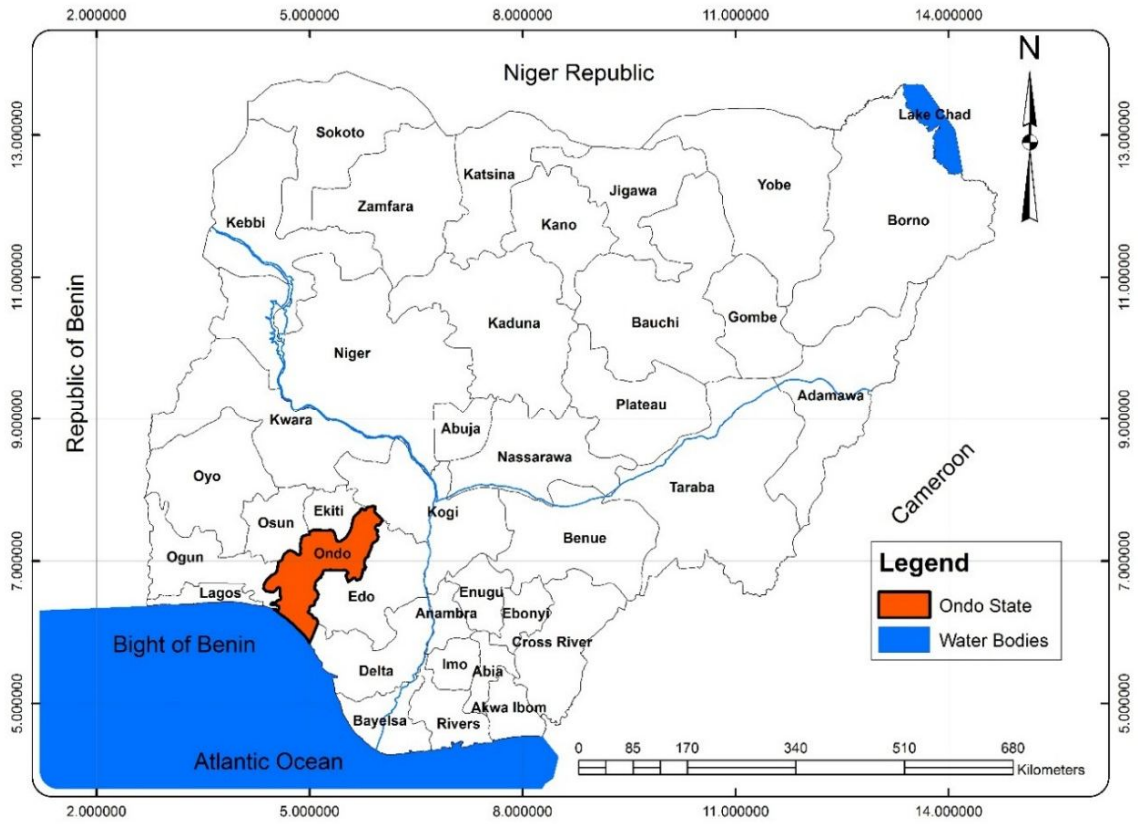

Figure 1: Map of Ondo State in National Context
Source: Ondo State Ministry of Physical Planning and Urban Development, 2021

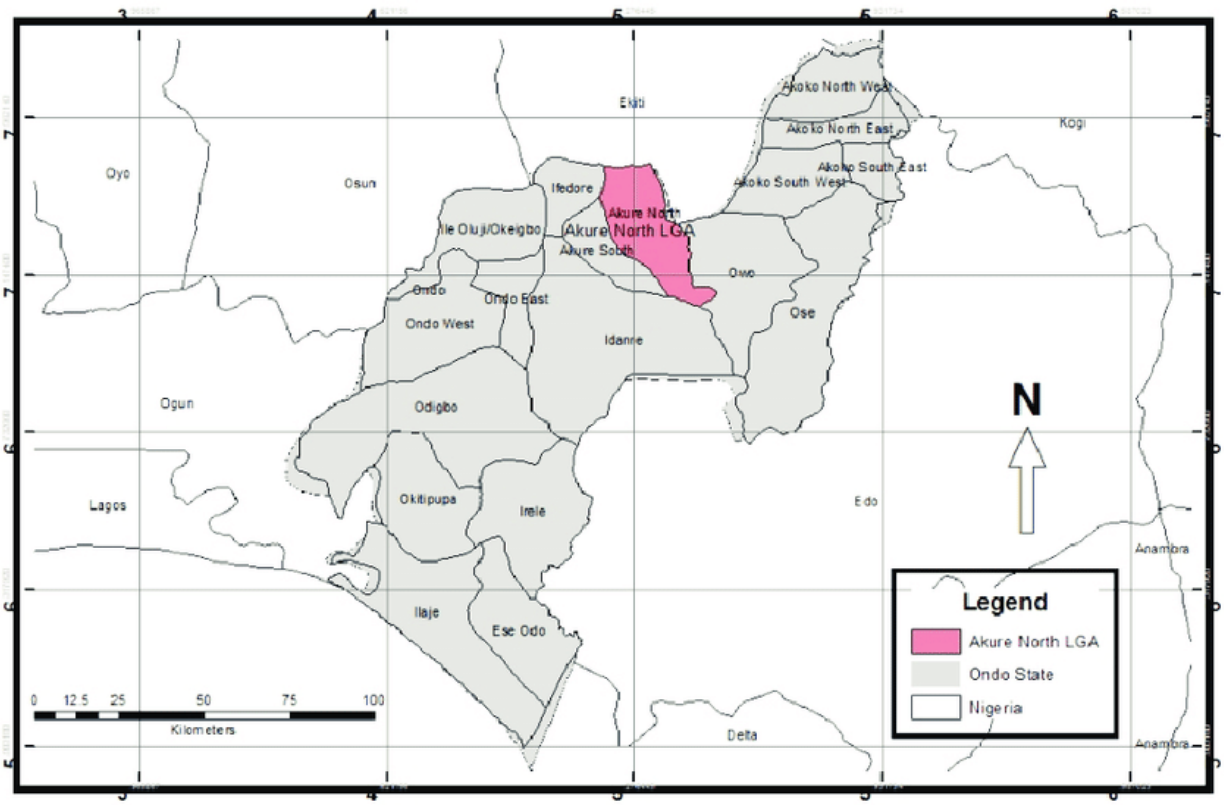

Figure 2: Map of Akure North Local Government in Ondo State Context
Source: Adapted from Popoola, 2019

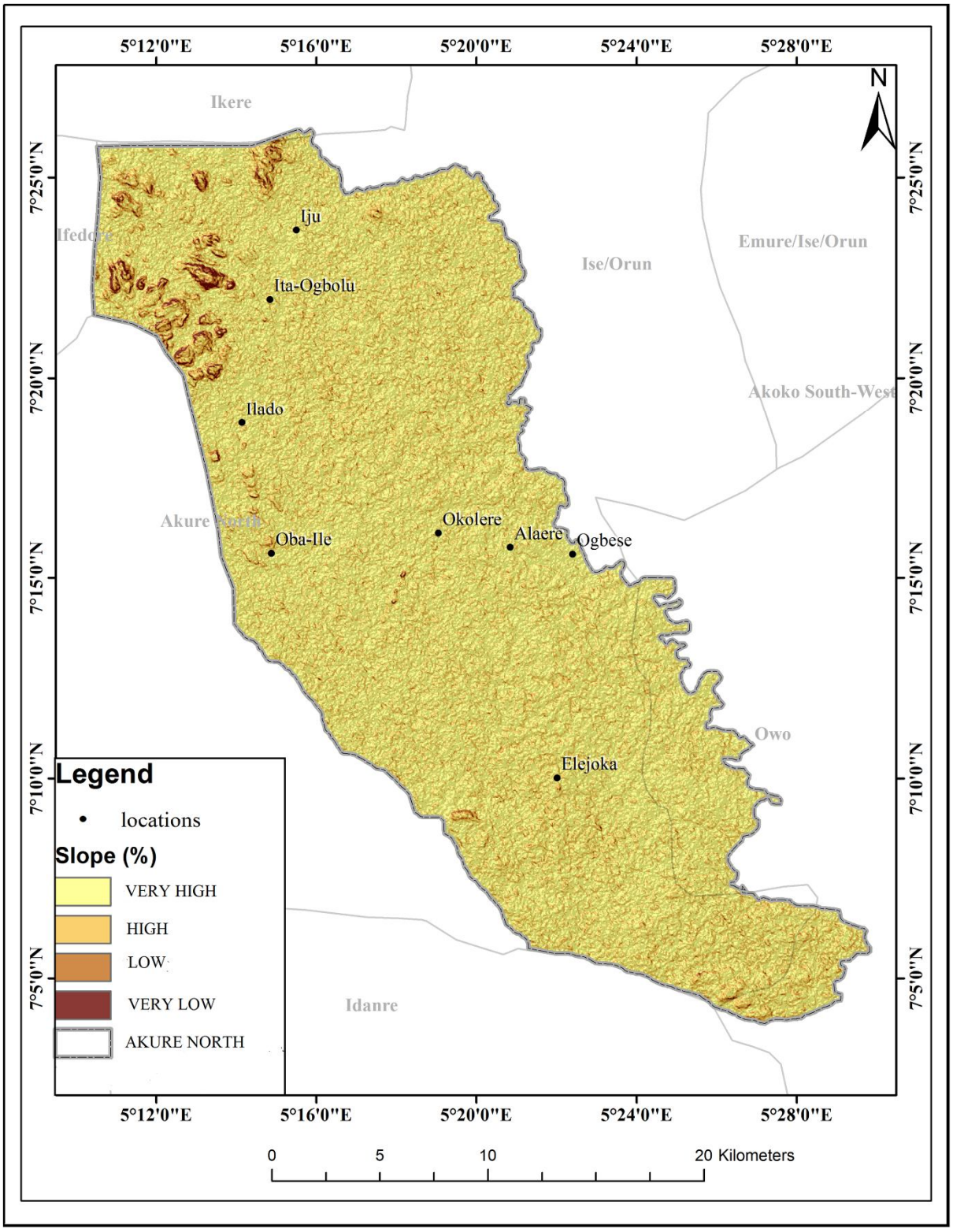

Figure 3: Map of Akure North Local Government Showing Communities
Source: Adapted from Ajakaye, Adedeji and Ajayi, 2017

3.2 Methodology

This study began with a reconnaissance survey to the five selected neighbourhoods of Akure North LGA, this was done to be familiar with the existing condition of water supply in the study area. The selected communities were: Ita-Ogbolu, Ogbese, Igoba, Iju, and Oba-Ile. The choice of these communities is because they have the largest population in the local government which indicate that there will be more demand for potable water among the inhabitants. Also, these are the major communities in the local government area [17]. This paper made use of the survey research design which focused on data collection about potable water supply in the study area through the use of questionnaire.

The simple random sampling method was employed in selecting the respondents for questionnaire administration. The household heads were the source of primary data in household survey. However, the survey was not limited to household heads only, thus, in cases where the household head was not available; an adult who has deep knowledge about the household, its water supply system and practices was selected as a respondent. The questionnaires were distributed and retrieved within a period of 3 weeks. The total population for each community as displayed by Table 1, was gotten from Nigeria Population Commission 1991 and was projected to 2020 using the annual growth rate of 4.64 as used by Alabi [18] in a study which covered selected sprawl communities in both Akure South and Akure North LGAs. The population was projected to 2020 while the research was conducted in the year 2021 and lasted for six months.

Table 1: Sample Frame of the Study

Communities	Population [1991]	2020 Projection
Ita-Ogbolu	15671	60184
Ogbese	4320	16591
Igoba	355	1363
Iju	14679	56375
Oba-Ile	5381	20666
Total	**40051**	**155179**

Source: Author's compilation, 2021

A sample size of 466 respondents equalling 0.3 % of the population according to Table 2, was randomly selected across the five communities for questionnaire administration. This sample size was deemed appropriate considering Neuman [19] who opined that taking just 0.1% of the population as a sample would give a good representation of such population, especially when the population is homogenous and has a large population above 100,000.

Table 2: Sample Size for the Study

Communities	Sample Frame [2020 Projection]	Sample Size [0.3%]
Ita-Ogbolu	60184	181
Ogbese	16591	50
Igoba	1363	4
Iju	56375	169
Oba-Ile	20666	62
Total	**155179**	**466**

Source: Author's compilation, 2021.

4. Results and Discussion of Findings

This study assessed potable water supply in selected communities of Akure North, Local Government Area, Nigeria. This study looked at the main source of potable water available to residents in the area and problems associated with the main source of water. The study distributed 466 questionnaires, 453 were retrieved and fit for data analysis. This represents 97% of the expected total responses. This is considered sufficient for the study, given the homogeneous nature of the communities under investigation.

4.1 Availability of Domestic Water Sources

The study area is abundantly blessed with water resource with plethora of underground and surface water sources in considerable quantity and quality to meet the domestic water needs of the local government when appropriately harnessed with the right technology, programmes and policies, given that domestic water supply is the statutory responsibility of government at state and local levels in Nigeria. It is pertinent to note that piped water are public fetching points and packaged water are bottle or/and sachet water delivered to households. This study shows that 53.9% of the respondents admitted that covered wells are conspicuously available in the study localities [Table 3]. In addition, Table 4 further shows other various sources of water accessed by households in Akure North Local Government Area. These were Uncovered wells [12.6%], Stream/River [10.2%], Borehole [9.1%], Piped water [5.7%], Rain water [4.6%], and Packaged water [4%].

This pattern of result shows the multiplicity of sources available to inhabitants of these communities [see Figures 4 and 5]. It equally shows that residents obtained water from multiple sources. This multiplex choice of water sources is important given that the dominant source of water in the study localities experience discontinuity due to low yield and seasonal variation.

Table 3: Available domestic water sources in the study area

	Stream/ River [%]	**Well [%]**	**Borehole [%]**	**Rain Water [%]**	**Piped Water [%]**	**Packaged Water [%]**	**Total [%]**
Igoba	0	50	25	25	0	0	0.9
Ita-Ogbolu	12.4	67.3	7.9	5.6	2.8	4.0	39.1
Iju	10.2	68.6	7.2	4.8	4.8	4.2	36.6
Oba-Ile	6.8	62.7	18.6	1.7	8.5	1.7	13.0
Ogbese	6.4	6.17	6.4	2.1	17.0	6.4	10.4
Total	10.2	66.5	9.1	4.6	5.7	4.0	100

Source: Field survey, 2021

Figure 4: Borehole infrastructure in Iju
Source: Field survey, 2021

4.2 Main Water Sources in Akure North Local Government Area

This study probes the principal source of domestic water supply accessible to households in Akure North Local Government Area, Ondo State, Nigeria. The findings in Table 4 reveal that 55.5% of the households depend primarily on covered hand dug wells [HDW] [Figure 6]. This was followed by the 13.7% of households who opted for boreholes as the primary source of water. In addition, other main sources were chosen, such as rain water [8.4%], stream and river [6.6%], uncovered well and piped water [6.0% each], and packaged water [3.8%]. It is obvious that covered HDWs were the dominant source of water among households, and packaged water was the least popular among residents.

Investigation reveals the reasons for the dominance of wells. First, the wherewithal of the households whose per capita income was low found it herculean to install better improved water sources that could guarantee unbridled access to adequate and safely managed water supply. Second, the hydrologic and tectonic formation of the study area also heighten the difficulties of extracting water from borehole, which is a reliable source of water supply for homes for drinking and domestic uses. Third, the prevalence of wells could be explained by the inability of the government to provide better sources of domestic water supplies to the governed in some of the communities covered in this study.

The survey also discovered that people relied on self-help mechanisms to finance and provide domestic water supplies for their households. From the standpoint of improved/unimproved source type classification, 87.4% of households depend on improved source of domestic water supply, while 12.6% relied on unimproved source. This is quite impressive, which is a testament to the continuous involvement of government and the unremitting desire of the people to have adequate access to improved water supply for their homes. Equally, the finding in the study area is a similitude of the Nigeria situation. The present estimates indicate an annual change of 1.72 with 78% of the Nigeria population accessing at least basic water services in 2020 compared to 69% in 2015 [20].

Table 4: Main Water Sources in Akure North Local Government Area

	Stream/ River [%]	Covered Well [%]	Uncovered Well [%]	Borehole [%]	Rain Water [%]	Piped Water [%]	Packaged Water [%]	Total [%]
Igoba	0	75	0	25	0	0	0	0.9
Ita-Ogbolu	9.6	57.6	4.5	7.9	13.0	2.3	5.1	39.1
Iju	5.4	5.6	7.8	18.1	6.6	3.6	2.4	36.6
Oba-Ile	3.4	61.0	5.1	18.6	3.4	6.8	1.7	13.0
Ogbese	4.3	38.3	6.4	12.8	4.3	27.7	6.4	10.4
Total	6.6	55.5	6.0	13.7	8.4	6.0	3.8	100

Source: Field survey, 2021

Figure 5: Dominant source of domestic water supply in the study area
Source: Field survey, 2021

4.3 Problem associated with the main source of drinking water in Akure North LGA

The indispensability of quality water to good health and improved standard of living cannot be over emphasized. This compelled people to access potable water from various sources for drinking and other domestic chores irrespective of deterrent such as distance and time taken to collect the water. However, these water sources have certain characters that could limit people from collecting water from them frequently. These attributes include unhygienic environment, unstable supply, tasty, colour, odour, long distance from home, always crowded surroundings among others.

This study investigates these attributes and found out that majority of respondents encountered some of these problems from their main water sources. The statistics in Table 5 reveal that 24.7% of respondents submitted that no problem whatsoever is attributed to their main water source. Seasonal variation was a principal component of water discontinuity in the study localities. Specifically, 16.6% of respondents submitted that water supply from their main sources was not constant. Buttressing this finding, a discussant who was a health practitioner in Iju disclosed that majority of protected hand dug wells in her neighbourhood were not reliable in both dry and rainy seasons. In support of this assertion, this study found out that 41.9% of respondents reported that their main sources of water were not reliable during dry season. Equally, 19.9% of respondents submitted that their main water sources were not reliable during rainy season.

This study asseverated that the discontinuity in water supply from the wells heighten water stress incurred from collecting water from alternative sources. This study confirmed that considerable number of covered wells lack the required quantity of water to serve the depending households [see Figures 7 and 8]. It is imperative to remind us that covered wells was the prevalent source of domestic water supply. Given that significant percentage of respondents were obliged to collect water from other sources, due to water discontinuity from many wells, unsolicited pressure shifted to other functional sources such as borehole and public standpoint piped water. For instance, this study confirmed that residents travelled long distance to access potable water in Iju. Equally, this resulted to overcrowding at water points.

Statistically, this study found out that 14.6% of respondents complained of long distance before collecting water from the main source. In addition, the other responses of residents are as follows: Unhygienic [15%], Taste salty/bad [4.4%], Coloured [5.5%], always crowded [6%], and Odour [13.2%]. The excessive patronage of these water points [borehole and piped water] birthed a certain unhealthy scenario; mud dank surface from stagnant water produced by spattering of water during collection. This creates unhealthy surroundings around the water points which could serve as fertile microbial environment that could be detrimental to human health. This study agreed with the submission of Adeleye, Medayese and Okelola [21] who noted that problems of water supply such as overcrowding bound women and children who are the purveyors of potable water on queues for long hours in kpakungu, Minna. They equally observed that residents who could not endure the queue were obligated to travel long distance to collect water for their households.

Table 5: Problem associated with the main source of drinking water

	Frequency	Percent	Mean	SD
Nothing	112	24.7		
Not clean/unhygienic	68	15.0		
Long time to get there	66	14.6		
Supply not constant	75	16.6		
Taste salty/bad	20	4.4		
Coloured	25	5.5		
Always crowded	27	6.0		
Odour	60	13.2		
Total	453	100.0	3.68	2.408

Field survey, 2021

Figure 6: Non-functional covered well in Iju
Source: Field survey, 2021

Figure 7: Solar powered borehole in Itaogbolu
Source: Field survey, 2021

4.4 Domestic water treatment methods in Akure North LGA

Having established that different sources of domestic water supply have certain problems, this study further examine treatment methods used to enhance the potability of water from these sources. Surface water is majorly contaminated through microbial surge, while underground water sources are safe, sometimes, they are contaminated through infiltration resulting from leaching of chemicals, and when located nigh to contaminating media such as pit latrine. Rainwater is treated as improved source of water, however, to be considered safe, rainwater captured at the beginning of rainy season should be treated as waste and should be allowed to flow away. This study found that 160 households [35.3%] reportedly treated their domestic water supply within the last 12 months. The findings in Table 6 show that boiling of water [52.5%] was the dominant water treatment method at the household domain. This is was followed by domestic chlorination [38.1%], use of ceramic filters [5.6%] and solar disinfection [3.8%]. Boiling is a low-cost strategy to treat water at the household level. Therefore, it was the prevailing treatment method in the study locale. It is imperative to note that ceramic filter is an effective tool to ensure households have access to safe water. Ceramic filtering is a proven way to reduce bacteria and protozoas in domestic water sources.

Literature is replete with studies on the effectiveness of ceramic filters to treat domestic water supply. For instance, Centre for Disease Control and Prevention [CDC] reported 60-70% reduction in the incidence of diarrhoea disease from water filtered by ceramic filters in developing countries. In addition, this study confirmed that residents add chlorine solution to overhead tanks in borehole and covered wells. Given that the reaction of chlorine and any organic matter in the water purified it for consumption. Therefore, consumption of chlorine treated water could only happen at least 30 minutes after the addition of chlorine to the water. The current reportage on lab effectiveness of chlorination shows its potency on the deactivation of bacteria and viruses that cause diarrhoea disease. The CDC study on its field effectiveness indicate that chlorination reduced the incidence of diarrhoea disease among residents. And it is a proven method against recontamination. Finer grained investigation through cross tabulation technique indicates that 75% of respondents who collected water from stream and river treated water through boiling. Similarly, 50% of respondents who drawn water from uncovered wells reported treating of water through boiling. This study revealed that boiling was the prevalent method of treating water from unimproved water sources. Importantly, water collected from improved sources were treated to avoid recontamination. Specifically, 60.7% of households who treated water through chlorination were applied to water in covered wells. The dominance of boiling is a similitude to treatment practice in SSA. The study of Geremew and Damtew [22] reported that the highest number of households [41%] treated water through boiling in SSA. In addition, over 50% of households in Nigeria, Burundi, Lesotho, Uganda, Tanzania, Namibia, and Togo treated water with boiling method.

Table 6: Method of domestic water treatment

	Frequency	Percent	Mean	SD
Boiling	84	52.5		
Use of ceramic filters	9	5.6		
Chlorination	61	38.1		
Solar disinfection	6	3.8		
Total	160	100.0	1.93	1.029

Field survey, 2021

4.5 Water Borne Diseases in Akure North LGA

Potable and safe water supply is momentous to good public health particularly the health of infants. Not gainsaying, water borne diseases are catalytic drivers of mortality and morbidity in all age groups especially in children under five years [UD5]. Specifically, diarrhoea has been marked as the leading cause of mortality in UD5 in developing countries. Recent studies reported that diarrhoea is the eight-causal agent of death in all age cohorts, the second contributor to mortality and leading cause of malnutrition in UD5 [23]; [24].

Drinking morbific contaminated water is a principal vector of water borne diseases, and therefore improving communities and households water supply continue to gain attention in international endeavours. It is pertinent to remind us that over 12% of households reported unimproved sources of water for drinking and other domestic chores. Equally, it is apropos to note that significant number of people travel long distance to collect water. This calls for concern, because of the long-time exposure of water to airborne pollutants. In this connection, recontamination of potable water could render water from these improved sources unsafe for consumption. Thereby, increasing the likelihood of incidence of water borne diseases.

To further expound vividly, the problems associated with domestic water supply, this study examines the affliction of people from water borne diseases. It is express belief of the researcher that the presence of water borne diseases affects the quality of water from the identified sources and invariably gauges the fit of water for human consumption. The study found that 143 respondents [31.6%] had been afflicted within the last 12 months with one or more water borne diseases. Typhoid [35.7%] was the prevalent water borne diseases among households, closely followed by diarrhoea [31.5%] [Table 7].

Further discovery reveals that 60% of respondents who obtained water mainly from stream/river reported diarrhoea. In addition to this, highest number of respondents who collected water mainly from borehole [45.5%], piped water [33.3%], and packaged water [60%] reported typhoid. In essence, this study infers that typhoid is associated with underground water sources, and diarrhoea colligate with surface water. Supporting this view, 41.2% of households that reported typhoid obtained water primarily from covered well. The cases of cholera [21%] were high too, and guinea worm [2.1%] was not popular among residents.

Approaching the discussion from the last, the low incidence of guinea worm conforms to deductive expectations, the geo-climatic environment of the study localities is not conducive to such vector-borne disease. Guinea worm broods in stagnant surface water, and more often than not, are found in coastal communities. One striking disease that associates with unsafe water supply in developing countries [where Nigeria lies] is Typhoid. It has been identified as prominent public health disease in Africa. The perception of households in this survey and discussion with health personnel substantiates the association between typhoid and domestic water supply. This study emphatically stated that the transmission of typhoid pathogens in the study area was strongly linked to contamination of domestic water supply among others. Judging from the discussion with respondents, this study confirmed that the transmission of typhoid disease assumed multiple tracts of environmental exposure such as drinking unsafe and untreated water supply, food from person infected from typhoid, roadside eatery and outdoor vending store, inadequate sanitation and poor hygiene.

Faecal oral route has been branded as a pathway of transmission for diarrhoea, which water supply is a spectacular component. One obvious finding is that feacal contamination of surface water appeared to be aggravated by the incidence of open defecation in open fields, bushes, and vacant plots sandwich between buildings. In scrutinizing the etiology of diarrhoea among residents, this study discovered that dearth of safe water supply, sanitation and hygiene were prominent among households in the study locale. Overall, this study confirms the studies by Adekunle et al. [25]; Biu and Agbadu [26] that associated the incidence of water borne diseases to contamination of drinking water with pathogenic organisms in Nigeria towns.

Judging from this study, it is obvious no significant improvement can be made in attaining adequate and safe water supply to households in the study area without dealing with the occurrence and transmission of water borne diseases. Taking multiple barrier approach to break the transmission route of these diseases will be crucial to the local attainment of Sustainable Development Goals targets 6.1 and 3.9. The standard deviation shows relative consistency in the responses of respondents; in addition to the mean value, they affirmed the prevalence of typhoid and diarrhoea diseases in the study localities.

Table 7: Incidence of water borne diseases in the study area

	Frequency	**Percent**	**Mean**	**SD**
Diarrhoea	45	31.5		
Typhoid	51	35.7		
Guinea worm	3	2.1		
Cholera	30	21.0		
Dysentery	14	9.8		
Total	143	100.0	2.42	1.376

Field survey, 2021

The statistics in Table 8 shows the responses of households on the frequency of water borne diseases. This study found that 45.5% of respondents submitted that the incidence of diseases was less frequent, followed by 27.3% who noted that occurrence of diseases was frequent. The findings show that less than half of the respondents claimed that the incidence of water borne diseases was sporadic within the previous 12 months. This study concludes that the occurrence of water borne diseases in the study area was intermittent, however, health practitioners believed self-medication especially use of herbs, instead of using health facilities, contributes to low frequency reported by households. The standard deviation validates this finding with its relative consistency.

Table 8: Frequency of water borne diseases

	Frequency	Percent	Mean	SD
Less Frequent	65	45.5		
Fairly Frequent	27	18.9		
Frequent	39	27.3		
Very Frequent	12	8.4		
Total	143	100.0	1.99	1.035

Field survey, 2021

5. Conclusion and Recommendations

This paper assessed the potable water supply situation in Akure North Local Government while critically assessing the following objectives: the main source of potable water supply available to residents in the study area, the problems associated with the identified main water source and how the problems can be mitigated. The simple random sampling method was used to administer questionnaire to household heads in the study area. Results obtained revealed that the main source of water supply in the study area were stream/river, uncovered well, covered well, rain water, packaged water, borehole, and piped water. However, protected hand dug well was the dominant source of domestic water supply in all communities covered in the study. This study considers the problems common to the various sources of water supply to households. It covers queuing resulting from inadequate potable water facilities and water scarcity, problems common to drinking water which result to treatment and potability of water, reliability of water during dry and rainy seasons, and water borne diseases associated with domestic water sources. Based on the empirical analysis results, this study proposed the construction of mini water scheme by the state government and some corporate individuals, this will curb shortage of water problem in the communities. The water points should be within 500m of resident's homes such that residents do not ambulate more than 30 minutes round trip from fetching points. This study also recommends the construction of a dam for multifarious purposes such as domestic water supply, irrigation among others. The distribution network should have decentralised waterworks at the main satellite towns within its catchment and area of influence. The local government council should engage faith-based organisations and schools to communicate the need to treat water before consumption. It is important that health practitioners train residents on the quantity, time and mechanism of different treatment methods. The domestic water mass campaign should also focus on marketing of water treatment products to the people. This is to ensure that people have unbridled access to water treatment items.

Authenticity of Data

The information supplied in this paper is accurate and trustworthy.

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